

CLAIMS

I claim as deserving the protection of Letters Patent:

1. A high impact game ball comprising:

a core structure comprising a spherical member;

5 a spherical casing concentrically disposed relative to the spherical member of the core structure;

at least one surface deviation disposed relative to the spherical member of the core structure;

10 at least one corresponding surface deviation disposed relative to the spherical casing in a mating relationship with the at least one surface deviation disposed relative to the spherical member of the core structure.

2. The high impact game ball of claim 1 wherein the at least one surface deviation disposed relative to the spherical member of the core structure comprises a registration projection and
15 wherein the at least one surface deviation disposed relative to the spherical casing comprises a registration indentation that corresponds to the registration projection.

3. The high impact game ball of claim 2 wherein the registration projection comprises a post that projects from the spherical member of the core structure and into the registration indentation of
20 the spherical casing.

4. The high impact game ball of claim 2 wherein there are a plurality of registration projections that project from the spherical member of the core structure and into corresponding registration indentations of the spherical casing.

5 5. The high impact game ball of claim 4 wherein each of the plurality of registration projections comprises a metal post.

6. The high impact game ball of claim 1 further comprising a switching arrangement embedded in the spherical member of the core structure wherein the switching arrangement comprises a
10 means for sensing an activation condition relative to the switching arrangement, a means for triggering a response upon an occurrence of the activation condition, and a means for exhibiting the response based on the occurrence of the activation condition.

7. The high impact game ball of claim 6 wherein the means for sensing an activation condition
15 comprises a means for sensing an impact relative to the high impact game ball.

8. The high impact game ball of claim 7 wherein the means for exhibiting a response based on the occurrence of the activation condition comprises a light source for being activated in response to an impact relative to the high impact game ball.

9. The high impact game ball of claim 7 wherein the means for exhibiting a response based on the occurrence of the activation condition comprises a sound source for being activated in response to an impact relative to the high impact game ball.

5 10. The high impact game ball of claim 6 wherein the means for sensing an activation condition comprises a means for sensing a remote activation signal whereby the response can be caused to be exhibited by a remote activation signal.

11. The high impact game ball of claim 10 wherein the means for sensing an activation
10 condition comprises a means for sensing an infrared activation signal.

12. The high impact game ball of claim 10 wherein the means for sensing an activation condition comprises a means for sensing a sound signal.

15 13. The high impact game ball of claim 10 wherein the means for exhibiting a response based on the occurrence of the activation condition comprises a light source for being activated in response to a remote activation signal.

14. The high impact game ball of claim 10 wherein the means for exhibiting a response based on
20 the occurrence of the activation condition comprises a sound source for being activated in response to a remote activation signal.

15. The high impact game ball of claim 1 further comprising a plurality of positioning stays that each project from the spherical member of the core structure an amount substantially equal to a radial thickness of the spherical casing whereby the plurality of positioning stays can ensure a concentric relationship between the spherical member of the core structure and the spherical casing.

16. The high impact game ball of claim 15 wherein each of the plurality of positioning stays comprises a generally rigid strand of material that projects radially from the spherical member of the core structure.

17. The high impact game ball of claim 16 wherein the spherical casing is formed by injection molding.

18. The high impact game ball of claim 1 further comprising a spherical shell disposed to envelope the spherical casing and the core structure.

19. The high impact game ball of claim 18 further comprising a plurality of interior surface deviations disposed on the spherical shell and a plurality of corresponding exterior surface deviations disposed on the spherical casing whereby relative movement between the spherical shell and the spherical casing is prevented.

20. The high impact game ball of claim 19 wherein the spherical shell has a generally smooth exterior surface.

21. The high impact game ball of claim 19 further comprising a plurality of exterior surface
5 deviations disposed on the spherical shell.

22. The high impact game ball of claim 18 wherein the spherical member of the core structure is formed from a polycarbonate resin under a high pressure injection molding process, wherein the spherical casing is formed from a high density silicone under an injection molding process, and
10 wherein the spherical shell is formed under an injection molding process.

23. The high impact game ball of claim 1 further comprising a lightweight spherical layer with a specific gravity of less than 1.

15 24. The high impact game ball of claim 23 wherein the high impact game ball has a specific gravity of not greater than 1.

25. The high impact game ball of claim 23 wherein the lightweight spherical layer comprises an aerogel.

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26. The high impact game ball of claim 1 further comprising a luminescent layer for enabling the high impact game ball to emit light.

27. The high impact game ball of claim 26 wherein the luminescent layer comprises a sub-layer.

28. The high impact game ball of claim 26 wherein the luminescent layer comprises an outer
5 layer.

29. The high impact game ball of claim 6 further comprising an access conduit with a proximal
end adjacent to the switching arrangement and a distal end in communication with an exterior
surface of the high impact game ball.

10 30. The high impact game ball of claim 29 wherein the means for sensing an activation
condition relative to the switching arrangement comprises a switch disposed adjacent to the
proximal end of the access conduit.

15 31. The high impact game ball of claim 30 further comprising an elongate probe adapted to be
received into the access conduit for triggering the switch of the switching arrangement whereby
the elongate probe can be employed to induce an activation condition.

20 32. The high impact game ball of claim 29 further comprising an elongate probe adapted to be
received into the access conduit and a means for passing power through the elongate probe
whereby the elongate probe can be employed to provide power to the switching arrangement.

33. A game ball comprising:

a spherical member;

a switching arrangement embedded in the spherical member wherein the switching arrangement comprises a means for sensing an activation condition relative to the switching
5 arrangement, a means for triggering a response upon an occurrence of the activation condition, and a means for exhibiting the response based on the occurrence of the activation condition; and

an access conduit with a proximal end adjacent to the switching arrangement and a distal end in communication with an exterior surface of the game ball.

10 34. The game ball of claim 33 wherein the means for sensing an activation condition relative to the switching arrangement comprises a switch disposed adjacent to the proximal end of the access conduit.

35. The game ball of claim 34 further comprising an elongate probe adapted to be received into
15 the access conduit for triggering the switch of the switching arrangement whereby the elongate probe can be employed to induce an activation condition.

36. The game ball of claim 33 further comprising an elongate probe adapted to be received into the access conduit and a means for passing power through the elongate probe whereby the
20 elongate probe can be employed to provide power to the switching arrangement.

37. The game ball of claim 36 wherein the switching arrangement further comprises a rechargeable means for retaining power whereby the elongate probe and the means for passing power through the elongate probe can be employed to recharge the means for retaining power.

5 38. The game ball of claim 33 further comprising a lightweight spherical layer that envelopes the spherical member wherein the lightweight spherical layer has a specific gravity of less than 1.

39. The game ball of claim 38 wherein the game ball has a specific gravity of not greater than 1.

10 40. The game ball of claim 38 wherein the lightweight spherical layer comprises an aerogel.

41. The game ball of claim 33 further comprising a luminescent layer that envelopes the spherical member for enabling the game ball to emit light.

15 42. The game ball of claim 33 wherein the means for sensing an activation condition comprises a means for sensing an impact relative to the game ball.

43. The game ball of claim 42 wherein the means for exhibiting a response based on the occurrence of the activation condition comprises a light source for being activated in response to
20 an impact relative to the game ball.

44. The game ball of claim 33 wherein the means for exhibiting a response based on the occurrence of the activation condition comprises a sound source for being activated in response to an activation condition.

5 45. The game ball of claim 33 wherein the means for sensing an activation condition comprises a means for sensing a remote activation signal whereby the response can be caused to be exhibited by a remote activation signal.

46. The game ball of claim 33 wherein the means for sensing an activation condition comprises
10 a means for sensing a sound signal.

47. A method for constructing a high impact game ball comprising the following steps:

forming a spherical member to form a core structure;

forming a spherical casing to envelop the spherical member of the core structure in a
15 concentric relationship;

forming at least one surface deviation relative to the spherical member of the core structure;

forming at least one corresponding surface deviation relative to the spherical casing wherein the at least one corresponding surface deviation relative to the spherical casing is
20 disposed in a mating relationship with the at least one surface deviation disposed relative to the spherical member of the core structure.

48. The method of claim 47 wherein the step of forming a spherical casing is carried out in an injection molding process and includes cooling the spherical casing by an active cooling method.

49. The method of claim 47 wherein the step of forming at least one surface deviation relative to the spherical member of the core structure comprises forming a registration projection and wherein the step of forming at least one corresponding surface deviation disposed relative to the spherical casing comprises forming a registration indentation that corresponds to the registration projection.

50. The method of claim 47 further comprising the step of embedding a switching arrangement in the spherical member of the core structure wherein the switching arrangement comprises a means for sensing an activation condition relative to the switching arrangement, a means for triggering a response upon an occurrence of the activation condition, and a means for exhibiting the response based on the occurrence of the activation condition.

51. The method of claim 50 wherein the means for sensing an activation condition comprises a means for sensing a remote activation signal whereby the response can be caused to be exhibited by a remote activation signal.

52. The method of claim 50 wherein the means for sensing an activation condition comprises a means for sensing a sound signal.

53. The method of claim 50 further comprising the step of forming an access conduit with a proximal end adjacent to the switching arrangement and a distal end in communication with an exterior surface of the game ball.

5 54. The method of claim 53 wherein the means for sensing an activation condition relative to the switching arrangement comprises a switch disposed adjacent to the proximal end of the access conduit.

55. The method of claim 54 further comprising the step of providing an elongate probe adapted
10 to be received into the access conduit for triggering the switch of the switching arrangement whereby the elongate probe can be employed to induce an activation condition.

56. The method of claim 53 further comprising the steps of providing an elongate probe adapted to be received into the access conduit and a means for passing power through the elongate probe
15 whereby the elongate probe can be employed to provide power to the switching arrangement.

57. The method of claim 47 further comprising the step of disposing a plurality of positioning stays projecting from the spherical member of the core structure an amount substantially equal to a radial thickness of the spherical casing wherein the step of disposing the plurality of
20 positioning stays occurs before the step of molding the spherical casing whereby the plurality of positioning stays ensure a concentric relationship between the spherical member of the core structure and the spherical casing.

58. The method of claim 47 further comprising the step of forming a spherical shell disposed to envelope the spherical casing and the core structure.

5 59. The method of claim 58 further comprising the step of forming a plurality of interior surface deviations relative to the spherical shell and a plurality of corresponding exterior surface deviations relative to the spherical casing whereby relative movement between the spherical shell and the spherical casing is prevented.

10 60. The method of claim 58 wherein the spherical member is formed from a polycarbonate resin under a high pressure injection molding process, wherein the spherical casing is formed from a high density silicone under an injection molding process, and wherein the spherical shell is formed under an injection molding process.

15 61. The method of claim 47 further comprising the step of forming a lightweight spherical layer with a specific gravity of less than 1.

62. The method of claim 47 further comprising the step of forming a luminescent layer for enabling the high impact game ball to emit light.